U.S. Department of Transportation
Federal Highway Administration

TMC Update

TRANSPORTATION MANAGEMENT CENTER POOLED FUND STUDY

■ Volume 1 ■ Number 3 ■ July 2005

WHAT'S INSIDE

HOW TO JOIN...

Agencies may join the TMC Pooled Fund Study at anytime during the year by committing funds at a level agreed upon by existing participants (members) in the study. The TMC pooled fund study was approved for 100 percent State Planning and Research Program funding. Any noncommercial agency or organization that is responsible for the management and operation of any portion of the surface transportation system is welcome to participate.

State transportation agencies interested in joining the TMC Pooled Fund Study can submit funding commitment online at the Transportation Pooled Fund Program web site at: **http://www.pooledfund.org.** (see Solicitation No. 870; SPR-2(207))

Other agencies should complete and submit the TMC Pooled Fund Study commitment form downloadable at the TMC Pooled Fund Study web site at: **http://tmcpfs.ops.fhwa.dot.gov.**

Annual Meeting Held in June 2005

The Transportation Management Center (TMC) Pooled Fund Study (PFS) held its annual meeting on June 14–15, 2005. Practitioners from 19 participating agencies met at the Rhode Island Department of Transportation's (DOT's) TMC in Providence. Raj Ghaman and Thomas Granda, both of Federal Highway Administration (FHWA), welcomed participants in their opening remarks. They praised the accomplishments of the TMC PFS and noted the groups efforts have not gone unnoticed by the FHWA and/or peers in the industry. The success and structure of the group has been adopted by many similar pooled fund studies. The morning meeting sessions of the meeting followed by a series of presentations covering the status and results of current TMC PFS projects.

TMC PFS core business was discussed in afternoon sessions

In the afternoon, members assembled to discuss the core TMC PFS business. The agenda continued with a review of the study's finances and selection of projects to be initiated in 2006. Nine project proposals were developed for members consideration prior to the meeting. At the meeting, the members reviewed, revised, and prioritized the proposals through an iterative process.

*See **Annual Meeting**, Page 6*

Feature Article: Guidelines for Transportation Management Systems Maintenance Concept and Plans

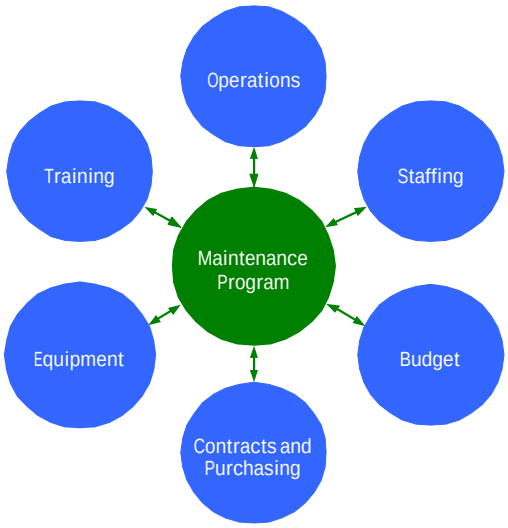
Transportation Management Systems (TMS) are complex, integrated amalgamations of hardware, technologies, and processes for performing an array of functions, including data acquisition, command and control, computing, and communications. Disruptions or failures in the performance of these functions can impact traffic safety, reduce system capacity, and ultimately lead the traveling public to lose faith in the transportation network. System failures also have the potential to cause measurable economic loss and increase congestion, fuel consumption, pollutants, and traffic crashes. The problem is further complicated by the fact that today's systems, subsystems, and components often are highly interdependent, meaning that a single malfunction can critically impact the ability of the overall systems to perform their intended functions.

System maintenance refers to a series of methodical, ongoing activities designed to minimize the occurrence of systemic failures and to mitigate their impacts when failures do occur. These activities include replacing worn components, installing updated hardware and software, tuning the systems, and anticipating and correcting potential problems and deficiencies. Maintenance includes the development and implementation of action plans for responding quickly, efficiently, and orderly to systemic failures. It also includes an infrastructure and procedures for measuring and monitoring maintenance activities.

The *Guidelines for Transportation Management Systems Maintenance Concept and Plans* summarizes the problems, challenges, and barriers that agencies are facing. These barriers include lack of commitment, shortage of resources, and dearth of knowledge regarding tools and techniques for securing and allocating scarce maintenance resources throughout the TMS lifecycle. This document offers technical guidance to practitioners on:

- How to identify, justify, and document the potential components of a maintenance program. Such a program can provide the necessary resources, environment, policies, procedures, and support services needed to maintain a TMS.
- A multi-year maintenance program plan, including the (a) potential components, (b) processes, (c) stakeholders to be involved, and (d) resources required to support the program.
- The idea of a "maintenance concept," the appropriate elements comprising a maintenance concept, how the maintenance concept can be used to develop system and functional requirements, and how the maintenance concept can be used to develop an operations concept for TMS.
- Policies, procedures, system and functional requirements, equipment, resources, and services, and other potential activities needed to maintain and support the TMS.

In real-world settings, TMS failures will, of course, occur. Consequently, transportation agencies must plan for and respond to these expected failures. This requires the agencies to anticipate and furnish the resources, capabilities, and services necessary to maintain the systems throughout their productive lives.

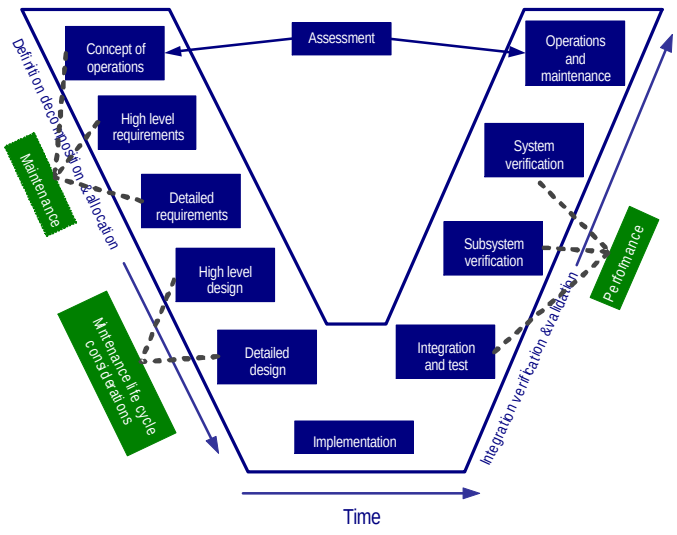


Relationships Among Maintenance Program Components

Maintenance plans should be tailored to the technologies comprising the TMS and to the level of maintenance support the agency is capable of providing. Indeed, it is important the level of maintenance that an agency can support be integrated from the outset into the planning process and design of the system.

The 105-page handbook is divided into nine chapters and four appendices:

- Chapter 1: Introduction
- Chapter 2: Maintenance Considerations & Activities
- Chapter 3: Maintenance Concept & Requirements
- Chapter 4: Maintenance Considerations for the Life-Cycle of TMC
- Chapter 5: TMC Maintenance Program Guidelines
- Chapter 6: TMC Maintenance Program Planning – Multi-Year Considerations
- Chapter 7: Maintenance Program Support – Tools & Techniques
- Chapter 8: Glossary
- Chapter 9: References
- Appendix A: Example Trouble Reports
- Appendix B: Maintenance Procedures for ITS Devices
- Appendix C: Generic Contract Format
- Appendix D: Extended Warranty Between ACME Integrators and Agency



Incorporation of Maintenance Concept into Systems Engineering Process

The document is to be used as a technical reference manual – a resource document that provides an overview of the institutional and technical issues associated with the maintenance of a TMS. It will provide the user with a better understanding of the considerations required to develop a multi-year maintenance program for TMS. This document is targeted at Federal, State, and local practitioners involved in the implementation, operation, or maintenance of a TMS. The intended audience includes public and private stakeholders with direct or indirect TMS involvement. The managers, supervisors, engineers, planners, technicians, etc. involved in the development and operation of a TMS will find guidance and recommendations in this document for maintaining the system.

The resource guide is for practitioners in a range of job categories. In most instances, practitioners will not need to read the entire document, but can simply refer to those sections of the report containing materials relevant to their assignments. The table below identifies representative job titles or descriptions, followed by a list of the chapters or sections associated with the job categories. Study the pertinent chapters or sections. Then use the remainder of the document as a resource guide, which can be consulted as needed.

Position or Job Title	Suggested Chapter(s) and/or Section(s) in this Document
Administrator, DOT Secretary	Chapters 2, 3, and 7
Program Director, Program Manager	Chapters 2, 3, and 7
Project Manager	Chapters 2, 3, 4, and 5
Transportation Engineer	Chapters 2, 3, 4, and 5
Communication Engineer	Chapters 3. 4, 5, and Glossary
Maintenance Supervisor/Foreman	Chapters 5, 6 7, and Glossary
Shift Supervisor	Chapters 5, 6, 7, and Glossary
System Operator, Dispatcher	Chapters 5, 6, 7, and Glossary

The *Guidelines for Transportation Management Systems Maintenance Concept and Plans* is available at the FHWA Office of Operations website at http://www.ops.fhwa.dot.gov/docs/TMSMaintCptandPlans/ or through the TMC Pooled Fund Study web site at http://tmcpfs.ops.fhwa.dot.gov/cfprojects/new_detail.cfm?id=27&new=2. ■

Project Progress Reports

Ongoing TMC Pooled Fund Study projects are briefly described in the following paragraphs. Quarterly project progress reports can be accessed on the TMC Pooled Fund Study Web site: http://tmcpfs.ops.fhwa.dot.gov.

"Coordinated Freeway and Surface Street Operational Plans and Procedures"
Purpose: Develop a document that provides technical guidance and recommended practices on how to prepare plans, coordinate activities, and develop procedures and protocols to use in managing travel, controlling traffic, and providing services related to coordinating travel on freeways and arterial roadways.

Champions: Mark Newland, Indiana DOT, and Kamal Hamud, District of Columbia DOT
Status: Final report is currently being edited
Completion Date: December 2005
Contact: James Colyar: 202-493-3282; james.colyar@fhwa.dot.gov

"Developing and Using Concept of Operations in Transportation Management Systems"
Purpose: Develop a document that describes the need for a concept of operations for a transportation management system and provides technical guidance and recommended practices for developing and using a concept of operations throughout the system's life cycle.

Champion: Manny Agah, Arizona DOT
Status: Final report has been completed; Outreach materials will be available in Summer 2005
Completion Date: Summer 2005
Contact: Emiliano Lopez: 410-962-0116; emiliano.lopez@fhwa.dot.gov

"Impacts of Dynamically Displaying Messages on Changeable Message Signs"
Purpose: Develop preliminary guidance to practitioners for dynamically displaying messages on CMS and identify and recommend changes or new provisions to the FHWA *Manual on Uniform Traffic Control Devices.* This project will build upon the TMC Pooled Fund Study project "Changeable Message Sign Operation and Messaging Handbook."

Champion: Jeff Galas, Illinois DOT
Status: Draft report was submitted in May 2005
Completion Date: Summer 2005
Contact: Tom Granda: 202-493-3365; thomas.granda@fhwa.dot.gov

"TMC Clearinghouse Development and Initiation"
Purpose: Establish a central, one-stop clearinghouse at a Web site that houses a comprehensive database of TMC-related resources. The TMC clearinghouse will facilitate the sharing of information among practitioners and the dissemination of innovative tools, processes, problem-solving efforts, and capacity-building efforts to assist TMC practitioners in performing their duties and achieving the goals of their TMCs.
Champions: Manny Agah, Arizona DOT, and David Kinnecom, Utah DOT

MEMBER PROFILE

Manny Agah, PE
Traffic Operations Center Manager
Arizona DOT

Mr. Agah is the Traffic Operations Center Manager at the Arizona Department of Transportation (ADOT). As Operations Manager, he is responsible for statewide incident management and traveler information, urban traffic management and all system integration along with testing and IT related activities.

Mr. Agah has been with ADOT since 1984. Prior to becoming Operations Manager, he worked as the ADOT ITS Project Manager where he was responsible for the design, development and implementation of a $100 million, 100-mile freeway management system for the Phoenix and Tucson metropolitan areas, as well as the rural ITS deployment.

Since 1990 Mr. Agah has been involved with the ADOT ITS program implementation, comprising urban freeway management system, rural ITS activities, and commercial vehicle operations. He currently serves as a co-chair of the TMC Pooled Fund Study Group. In addition he is a champion and actively involved with several TMC Pooled Fund Study projects. He holds both a Master and Bachelor degree in Civil Engineering from West Virginia University.

Status: Project initiated in May 2005
Completion Date: April 2006
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Transportation Management Center Business Planning and Plans Handbook"
Purpose: Produce a handbook that provides guidance and best practices on how to develop a TMC business plan. The handbook will also outline business-planning models that were successfully employed by transportation agencies to ensure the long-term sustainability of TMCs and associated ITS applications.

Champion: Monica Kress, California DOT
Status: Draft handbook submitted in April 2005
Completion Date: Summer 2005
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"TMC Operator Requirements, Position Descriptions, Phase 2—Interactive Software Tool"
Purpose: Develop an interactive software tool that will embody the content material developed in the Phase 1 project, supplemented as necessary, and provide the functionality needed by TMC managers and other users to support development of useful position requirements and descriptions for TMC operator positions.

Champion: Mark Demidovich, Georgia DOT
Status: Software testing on-going
Completion Date: Summer 2005
Contact: Tom Granda: 202-493-3365;
thomas.granda@fhwa.dot.gov

"TMC Performance Monitoring, Evaluation, and Reporting Handbook"
Purpose: Develop a handbook that will explain the need for performance monitoring and serve as a technical reference that provides guidance and recommended monitoring practices. The handbook will advise how to initiate, sustain, and use information generated from monitoring, evaluating, and reporting on TMC performance and describe roles, responsibilities, functions, and support services as they relate to traffic management.

Champion: Mark Newland, Indiana DOT
Status: Incremental submission of draft chapters began in February 2005. Complete draft handbook is expected in July 2005
Completion Date: October 2005
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"TMC Staffing and Scheduling for Day-to-Day Operations"
Purpose: Develop a technical document that will assist TMC managers in making staff workload and scheduling decisions, performing future staffing forecasts, estimating timelines for personnel procurement and recruiting, and analyzing staffing costs and productivity.

Champion: Manny Agah, Arizona DOT
Status: Draft Annotated Outline submitted in May 2005
Completion Date: February 2006
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"TMC Pilot Workshop Development and Delivery"
Purpose: Promote the TMC Pooled Fund Study effort and increase awareness of the Study's products and tools to a broader audience base. The focus of this project is a pilot TMC workshop to be held in the summer/fall of 2006. Themes of the workshop will focus on current and future TMC Pooled Fund Study activities and other topics that are recommended.

Champion: John Corbin, Wisconsin DOT
Status: Project kick-off anticipated in Fall 2005
Completion Date: Summer/Fall 2006
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Transportation Management Center Operations Manual"
Purpose: Develop a technical document that provides guidance and recommends practices for initiating, developing, maintaining, and using TMC operations manuals. The technical document will be a detailed reference that addresses concepts, methods, processes, tasks, techniques, and other related issues for practitioners to consider in developing an operations manual for a TMC.

Champion: Peter Vega, Florida DOT
Status: Draft handbook submitted in April 2005
Completion Date: August 2005
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Regional, Statewide, and Multi-State TMC Concept of Operations and Requirements"
Purpose: Building off the existing *Developing and Using Concept of Operations in Transportation Management Systems*

Handbook, this project will develop a document that will provide detailed guidance on how to develop and use concept of operations and system requirements as it applies to the life cycle of a regional, statewide, or multi-state TMC.

Champion: Dottie Shoup, Nebraska DOR
Status: Project kick-off anticipated in Summer 2005
Completion Date: Expected in Fall 2006
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Procuring, Managing, and Evaluating the Performance of Contracted TMC Services"
Purpose: Develop a technical document that will provide guidance and recommended practice to TMC owners and managers in making decisions related to outsourcing portions, or in entirety, of their TMC or transportation management system operation to a private contractor or contractors.

Champion: Manny Agah, Arizona DOT
Status: Project kick-off anticipated in Summer/Fall 2005
Completion Date: Winter 2006
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Recovery and Redundancy of TMCs"
Purpose: Develop a technical document that will synthesize current practices and state of the practices, highlight technical issues, lessons learned, and recommended practices, and detail how to plan, develop and implement redundancy design and recover plans for TMCs and transportation management systems.

Champion: Monica Kress, Caltrans
Status: Project kick-off anticipated in Fall 2005
Completion Date: Winter 2006
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov

"Integration of TMC and Law Enforcement"
Purpose: Examine and define the concepts, methods, processes, and techniques for integrating the operational and technical functions and personnel of TMCs and law enforcement agencies to achieve a seamless relationship with these two entities.

Champion: John Domina, Nevada DOT
Status: Project kick-off anticipated in Fall 2005
Completion Date: Winter 2006
Contact: Tom Granda: 202-493-3365;
thomas.granda@fhwa.dot.gov

"TMC Clearinghouse Support Services, Phase 2"
Purpose: Enhance and improve the support services for the TMC clearinghouse website that will be available online in Spring 2006. The study will also evaluate consumer feedback and recommendations for enhancing and improving the features and contents of the clearinghouse.

Champion: TMC PFS Co-Chairs
Status: Project kick-off anticipated in Spring 2006
Completion Date: Spring 2007
Contact: Raj Ghaman: 202-493-3270;
raj.ghaman@fhwa.dot.gov ■

Annual Meeting

Continued from Page 1

Members continued project deliberation and prioritization in the morning on the second day. Six projects were then selected based on available funding. They include:

- Methodologies to Measure and Quantify TMC Benefits
- Driver Use of Real-Time En-Route Travel Time Information
- Developing Travel Time Information
- Requirements and Position Descriptions for TMC Support Staff
- Techniques for Managing Service Patrol Operations
- Best Practices for Road Condition Reporting Systems

Attendees of the 2005 TMC PFS Annual Meeting

The next TMC Pooled Fund Study annual meeting will be held on July 11-13, 2006 in Seattle, Washington. ■

New Publications

"ITS/Operations Resource Guide 2005 Traveler Information Integration Project within the East Bay SMART Corridors Project" (2005, FHWA-JPO-05-006) – A comprehensive listing of over 400 documents, websites, training courses, software tools, and points of contact related to ITS. An online version of the guide is available at: http://www.itsdocs.fhwa.dot.gov/guide.htm.

"Traveler Information Integration Project within the East Bay SMART Corridors Project" (December 2004, FHWA-JPO-05-033) – Conducted by the Congestion Management Agency (CMA) in cooperation with the Contra Costa County Transportation Authority (CCTA), this project focuses on deploying ITS technology for the East Bay SMART Corridors project. Twenty-two agencies will be able to electronically monitor video and exchange traffic date to manage congestion and incidents that occur in the corridor, and provide useful, multi-modal transportation information to the public and transportation managers. For additional information, visit: http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE/14127.htm.

"Intelligent Transportation Systems Benefits, Costs and Lessons Learned – Executive Summary" (May 2005, FHWA-JPO-05-002) – USDOT collected information and produced an overview on how ITS projects impact the operation of surface transportation networks. The document discusses how deploying ITS technologies can improve traffic systems, transportation safety and traffic congestion. This summer an ITS Lessons Learned Database will be completed, allowing the public to access detailed information via the Internet. For further details please visit: http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE/14073.htm.

"Benefits and Costs of Full Operations and ITS Deployment: A 2003 Simulation for Cincinnati" (May 2005, FHWA-JPO-04-031) Available at http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE//13979.htm.

"Benefits and Costs of Full Operations and ITS Deployment: A 2025 Forecast for Tucson " (May 2005, FHWA-JPO-04-032) – Available at: http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE//13978.htm.

"Benefits and Costs of Full Operations and ITS Deployment: A 2003 Simulation for Seattle" (May 2005, FHWA-JPO-04-033) – A series of comparative reviews provides a better understanding of the potential benefits of implementing ITS strategies in a metropolitan area. With little information available on this topic FHWA initiated the study in cooperation with USDOT. The cities of Tucson, Cincinnati and Seattle were selected as case study areas to represent small, medium and large metropolitan areas. Available at: http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE//13977.htm.

"Guidance for Transportation Agencies on Managing Sensitive Information" (June 2005) TRB has released Volume 5 of its NCHRP Report 525: Surface Transportation Security, a series of reports providing basic information on identifying and controlling access to sensitive information as it relates to security and transportation. Relevant information is assembled into single, concise volumes - each pertaining to a specific security problem and closely related issues. Future volumes of the report will be issued as they are completed. The complete Volume 5 is available at: http://trb.org/publications/nchrp/nchrp_rpt_525v5.pdf. ■

Event Calendar

July 14-15, 2005	Integrated Corridor Management Initiative Workshop, Philadelphia, Pennsylvania
July 27, 2005	Talking Operations Seminar: Rural Issues 511 and Traveler Information, web cast
August 7-10, 2005	ITE Annual Meeting Melbourne, Australia
August 24, 2005	Talking Operations Seminar: Transportation System Management – An Opportunity Emerging from Reauthorization, web cast
September 11-14, 2005	National Rural ITS Conference, Spokane, Washington
September 28, 2005	Talking Operations Seminar: Travel Time Messages on Dynamic Message Signs, web cast
November 6-10, 2005	12th ITS World Congress, San Francisco, California
January 22-26, 2006	TRB 85th Annual Meeting Washington D.C.

MEMBER NEWS

ADOT to Install Computer-Aided Dispatch Systems in TMCs

The Arizona Department of Transportation (ADOT) is in the process of obtaining Computer-Aided Dispatch Systems (CADS) for its TMCs. The CADS will allow TMCs being directly connected to the Department of Public Safety for receiving real-time traffic and incident information--but not criminal and investigative data. In addition, the TMCs in the Phoenix area have begun a center-to-center communications project, whereby the agencies will be able to share data and video.

NYSDOT Unveils Highway Work Zone Education Initiatives

The New York State Department of Transportation (NYSDOT) recently unveiled a new work zone education initiative featuring work zone safety messages appearing on trucks operated by CorCraft, a division of the State Department of Correctional Services. This is one of a series of efforts designed to educate the public on the importance of work zone safety. The program calls for 103 CorCraft trucks to feature messages prompting motorists to slow down in work zones. NYSDOT also announced a new, interactive work zone safety web site available at www.travelinfony.com or www.dot.state.ny.us.

NaviGAtor System Enhancements Planned for I-285

The Georgia Department of Transportation (GDOT) has authorized a $17.9 million, 18-mile expansion of its innovative NaviGAtor Intelligent Transportation System (ITS) on northwest and southeast segments of Interstate Highway 285. The project will entail the installation of fiber optic cable, elevated closed circuit and video monitoring and detection cameras, and changeable message signs along the affected roadway. This equipment will be linked to GDOT TMC to provide officials and NaviGAtor patrons with instantaneous status reports on traffic conditions. The new link will also facilitate a more rapid and accurate dispatch of the Highway Emergency Response Operators (HEROs) to incidents and disabled motorists in the affected areas.

END NOTES

By Raj Ghaman, raj.ghaman@fhwa.dot.gov

- FHWA is seeking input on its Freeway Management Program Plan. Please contact James Bunch of Mitretek Systems at jabunch@mitretek.org or Ms. Jessie Yung of the FHWA at Jessie.Yung@fhwa.dot.gov for more information.
- Integration of TMCs and Law Enforcement: It is difficult to define an appropriate scope for this project due to its complexity. The approach to this project has been suggested having a consultant to perform a need assessment first to better define the scope. Agencies that have information and examples related to this subject please send it to Tom Granda at thomas.granda@fhwa.dot.gov.

This space is reserved for further dialogue for members. We encourage you to provide your ideas, opinions, information, questions, or technical abstracts or articles to us.

CONTACTS

For information on the TMC Pooled Fund Study, visit our website at http://tmcpfs.ops.fhwa.dot.gov/ or contact:
Raj Ghaman, FHWA, 202-493-3270, raj.ghaman@fhwa.dot.gov
Tom Granda, FHWA, 202-493-3365, thomas.granda@fhwa.dot.gov
To request documents, general administrative issues, or Web site questions, contact:
Ming-Shiun Lee, URS, 612-373-6335, ming_shiun_lee@urscorp.com
TMC Pooled Fund Study Co-Chairs:
David Kinnecom, Utah DOT, 801-887-3707, dkinnecom@utah.gov
Manny Agah, Arizona DOT, 602-712-7640, magah@azdot.gov

Contribute articles for inclusion in the next TMC Update by September 15, 2005 to: ming_shiun_lee@urscorp.com